N O T I C E

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SOFTWARE ENGINEERING LABORATORY (SEL) COMPENDIUM OF TOOLS (REVISION 1)

FEBRUARY 1982

NASA
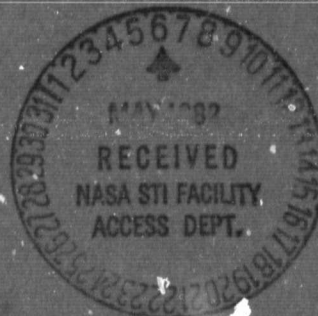National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

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FOREWORD

The Software Engineering Laboratory (SEL) is an organization
sponsored by the National Aeronautics and Space Administra-
tion Goddard Space Flight Center (NASA/GSFC) and created for
the purpose of investigating the effectiveness of software
engineering technologies when applied to the development of
applications software. The SEL was created in 1977 and has
three primary organizational members:

    NASA/GSFC (Systems Development and Analysis Branch)
    The University of Maryland (Computer Sciences Department)
    Computer Sciences Corporation (Flight Systems Operation)

The goals of the SEL are (1) to understand the software de-
velopment process in the GSFC environment; (2) to measure
the effect of various methodologies, tools, and models on
this process; and (3) to identify and then to apply success-
ful development practices. The activities, findings, and
recommendations of the SEL are recorded in the Software En-
gineering Laboratory Series, a continuing series of reports
that includes this document. A version of this document was
also issued as Computer Sciences Corporation document
CSC/TM-82/6038.

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Single copies of this document can be obtained by writing to

    Frank E. McGarry
    Code 582.1
    NASA/GSFC
    Greenbelt, Maryland 20771

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ABSTRACT

This document presents a brief description of each of a selected set of software tools in use at the Software Engineering Laboratory (SEL) of the Goddard Space Flight Center (GSFC) Mission Support Computing and Analysis Division (Code 580). These brief descriptions allow the reader to judge quickly the suitability of a particular software tool for a particular application.

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SECTION 1 - INTRODUCTION

This compendium of software tools provides a synopsis of a selected set of programs available to users of the Goddard Space Flight Center (GSFC) Mission Support Computing and Analysis Division (Code 530) Software Engineering Laboratory (SEL). The programs described are all software tools; that is, each program can be used as an aid to software developers in generating a given software product.

Although there is hardly a consistent definition as to what a software tool is or is not, the SEL definition generally includes all support programs that are used to aid the developer or manager in generating the software product. The SEL definition excludes such vendor-supplied programs as compilers. Examples of software tools include requirements analyzers, design languages, precompilers, code auditors, code analyzers, and software librarians.

Section 2 of this document describes each software tool available to SEL users; each description is presented in the format explained at the beginning of Section 2. The presentation is intentionally brief to allow the reader to make a quick judgment as to the suitability of a particular program for specific needs. A reader interested in a particular software tool may then find more detailed information in the documentation cited for that entry.

Users of the GSFC Code 580 SEL may use or obtain all of the described software tools, either as executable programs on the indicated computer or as system generation tapes containing the source code. Appendix A specifies the locations of all files and data sets required to execute each software tool. Documentation for each tool is available from the SEL library.

Each tool description includes an AVAILABLE ITEMS section. Where indicated, the software may be obtained in the form of system generation tapes (and accompanying documentation) from the GSFC Computer Program Library or the NASA Computer Software Management and Information Center (COSMIC).

The GSFC Computer Program Library will release the indicated programs to GSFC employees, GSFC contractor employees, and employees of other government agencies. The requestor should submit a Request for Program Retrieval form (Figure 1-1) and a blank magnetic tape to the Computer Program Library. GSFC contractor employees must obtain sponsor approval before submission of the request. Employees of other government agencies should include a letter detailing the need for the program. All requests should be directed to

> Goddard Space Flight Center
> Computer Program Library
> Building 23, Room C-238
> Greenbelt, Maryland 20771
>
> Telephone: (301) 344-6796

COSMIC will release the indicated programs to NASA employees, the general United States public, and foreign organizations and individuals. If a tool is available from COSMIC, either two or three pieces of information are listed under System Tape Availability: the COSMIC identification number, the date COSMIC received the software, and the date COSMIC evaluated the software. All requests for programs or information about the programs should include the COSMIC identification number. No requests for software will be honored by COSMIC until after the evaluation date. When this document was issued, some of the programs had not yet been evaluated by COSMIC; this is indicated by the notation "in evaluation."

GSFC COMPUTER PROGRAM LIBRARY
REQUEST FOR PROGRAM RETRIEVAL

DATE OF REQUEST	REQUEST RECEIVED BY	REQUEST NO.		PAGE OF

Requester

NAME		TELEPHONE	SPONSOR APPROVAL OF CONTRACTOR REQUESTS	
			SPONSOR NAME	GSFC CODE
GSFC CODE/MAILING INSTRUCTIONS			SPONSOR SIGNATURE	DATE

Request Data

PROGRAM NUMBER, SYMBOLIC NAME OR TITLE:

LIBRARY OF ORIGIN (GSFC, COSMIC, ETC.)	REQUESTER LEARNED OF PROGRAM FROM:	REQUESTER CAN USE MICROFICHE: ☐ YES ☐ NO

DESCRIPTION OF PROGRAM (IF LIBRARY SEARCH IS REQUIRED (INCLUDE KEYWORDS)):

PROGRAM MATERIALS DESIRED:	COMMENTS:
☐ DOCUMENTATION ☐ LISTING ☐ PROGRAM DECK/TAPE	

Retrieval Record

RESTRICTION ON DISTRIBUTION? ☐ NO ☐ YES	COMMENTS:
PROGRAM MATERIALS RETRIEVED ☐ DOCUMENTATION ☐ LISTING ☐ PROGRAM DECK/TAPE ☐ EVERYTHING AVAILABLE	
PROGRAM VALUE: $ _____ BASED ON: ☐ CATALOG VALUE ☐ DEVELOPMENT COST ☐ RCD COUNT x 10	
☐ PDG INCLUDED ☐ PDG NOT INCLUDED	EXPLANATION:

MATERIALS READY FOR PICK-UP/MAILING AT _____ ON _____
REQUESTER NOTIFIED BY CPL GROUP? ☐ NO ☐ YES   DATE _____
RETRIEVAL COMPLETED BY _____

SUMMARY:
☐ COMPLETED
☐ CANCELLED

330-203 (2/74)   RECORD-COPY NO. 1

Figure 1-1.   GSFC Computer Program Library Request
for Program Retrieval Form

NASA employees should direct their requests for software or documentation from COSMIC through the Technology Utilization Office at their installation.

Requests from the general public for a program must be accompanied by a fee, which is determined separately for each program, to defray reproduction and mailing costs. Inquiries about fees, software, or documentation should be directed to

COSMIC
112 Barrow Hall
University of Georgia
Athens, Georgia 30602

Telephone: (404) 542-3265

Requests from organizations and individuals outside the United States.should also be d'rected to the address specified above. In general, requests from outside the United States can only be honored for software that is certified for foreign distribution. A determination on foreign distribution is made approximately 1 year after the program is received by COSMIC.

SECTION 2 - SOFTWARE TOOL DESCRIPTIONS

Each software tool described in this section is presented in a format that includes an abstract and several of the following optional sections: resource requirements, available items, and a processing summary.

The abstract provides information about the function of the tool. The abstract also describes the uses of the tool in the software development process.

The description of resource requirements lists the specific hardware and software used for operation and installation of the software tool in the SEL. The list indicates the minimum configuration required to support operation of the tool. The specific operating system version is not a strict requirement, but other versions may require some software modifications to the tool to attain correct operation.

For each tool, lists may be given of available items. These lists include all pertinent documentation and software. Some of the SEL software tools are available from COSMIC, the GSFC Computer Program Library, and the SEL Software Tools Library.

Finally, a processing summary is given for most tools. This processing summary illustrates the relationships among the tool, the user, the data files, and other software tools and utilities. Notes are given in the summary diagram to point out the significant features of each tool. In addition, file names are shown, where appropriate, and indicate the mandatory (upper case) and user-choice (lower case) naming conventions.

Table 2-1 provides an alphabetical list of the software tools described in the remainder of this section.

Table 2-1.   List of Software Tools

Tool Acronym	Computer	Tool Title
CAREM	PDP-11/70	Cost and Reliability Estimation Models
CAT	PDP-11/70	Configuration Analysis Tool
CAT	VAX-11/780	Configuration Analysis Tool
CSMR	PDP-11/70.	Common Software Module Repository
DBAM	PDP-11/70	Data Base Maintenance System
DOCLIB	PDP-11/70	Document Library Support Software
FINREP	PDP-11/70	Financial Report Generator Program
MARS	PDP-11/70	Manpower Allocation and Reporting System
MEDL-R	PDP-11/70	Multi-Level Expression Design Language - Requirements Level
NPP	PDP-11/70	NAMELIST Preprocessor Program
NPP	VAX-11/780	NAMELIST Preprocessor Program
SAP	PDP-11/70	FORTRAN Static Source Code Analyzer Program
SAP	VAX-11/780	FORTRAN Static Source Code Analyzer Program
SFORT	IBM-S/360	Structured FORTRAN Preprocessor
SFORT	PDP-11/70	Structured FORTRAN Preprocessor
SFORT	VAX-11/780	Structured FORTRAN Preprocessor

TOOL: COST AND RELIABILITY ESTIMATION MODELS (CAREM)

ABSTRACT

The Cost and Reliability Estimation Models (CAREM) Program is a collection of models designed to compute estimates of resources/productivity, costs, and, in the future, reliability/error analysis of computer software development. The models currently included were applied to the historical data of the SEL data base to appraise their applicability to the flight dynamics area.

Input to CAREM is a set of estimated parameters describing the software development project and the environment.

Output from CAREM is estimated costs and required resources.

RESOURCE REQUIREMENTS

PDP-11/70 Operating Resource Requirements

The resource requirements for operating CAREM on the PDP-11/70 are as follows:

Operating System: RSX-11M (Version 3.2)

User Interface: Terminal (CRT/Decwriter)

Output Device(s):   Terminal, lineprinter

Disk Storage: Task image:
                        CAREM.TSK = 215 blocks

PDP-11/70 Installation Resource Requirements

CAREM can be obtained in the form of a system tape. To install CAREM, the following are required:

Operating System: RSX-11M (Version 3.2)

Utilities: FLX

Language Processor(s): SFORT, FORTRAN-IV+

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

1. Cost and Reliability Estimating Models (CAREM)
   User's Guide (NASA/GSFC SEL document SEL-81-008)

2. An Appraisal of Selected Cost/Resource Estimation
   Models for Software Systems (NASA/GSFC docu-
   ment X-582-81-1 and NASA/GSFC SEL document
   SEL-80-007)

3. Software Engineering Laboratory Data Base Organiza-
   tion and User's Guide (Computer Sciences Corpora-
   tion document CSC/SD-81/6011 and NASA/GSFC SEL
   document SEL-81-002)

Availability:

   GSFC Computer Program Library (ID = GO 7* 1)

   GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for CAREM that contains the follow-
ing:

1. Tape description and installation guide

2. Command file to load the files on the CAREM tape to
   disk

3. Structured FORTRAN source code

4. FORTRAN source code

5. Command files to preprocess, compile, and task
   build CAREM

6. Overlay description file

7. All files required to build the structured FORTRAN
   Preprocessor (SFORT) (see description under
   SFORT(PDP-11/70), System Tape)

Availability:

   GSFC Computer Program Library (ID = G00768)

   GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY

```
   ┌─────────────┐
   │    USER     │
   └─────────────┘
          ╲ ①
           ╲
            ▼
   ┌──────────────────────────┐
   │         CAREM            │
   │  Models:                 │
   │     Doty                 │
   │  ② Tecolote              │
   │     Walston and Felix    │
   │     GRC                  │
   └──────────────────────────┘
      ╱                    ╲ ③
     ▼                      ▼
Lineprinter        ┌─────────────────┐
                   │  SEL Data Base  │
                   │                 │
                   │   HEADER.HDR    │
                   │   EST.HDR       │
                   └─────────────────┘
```
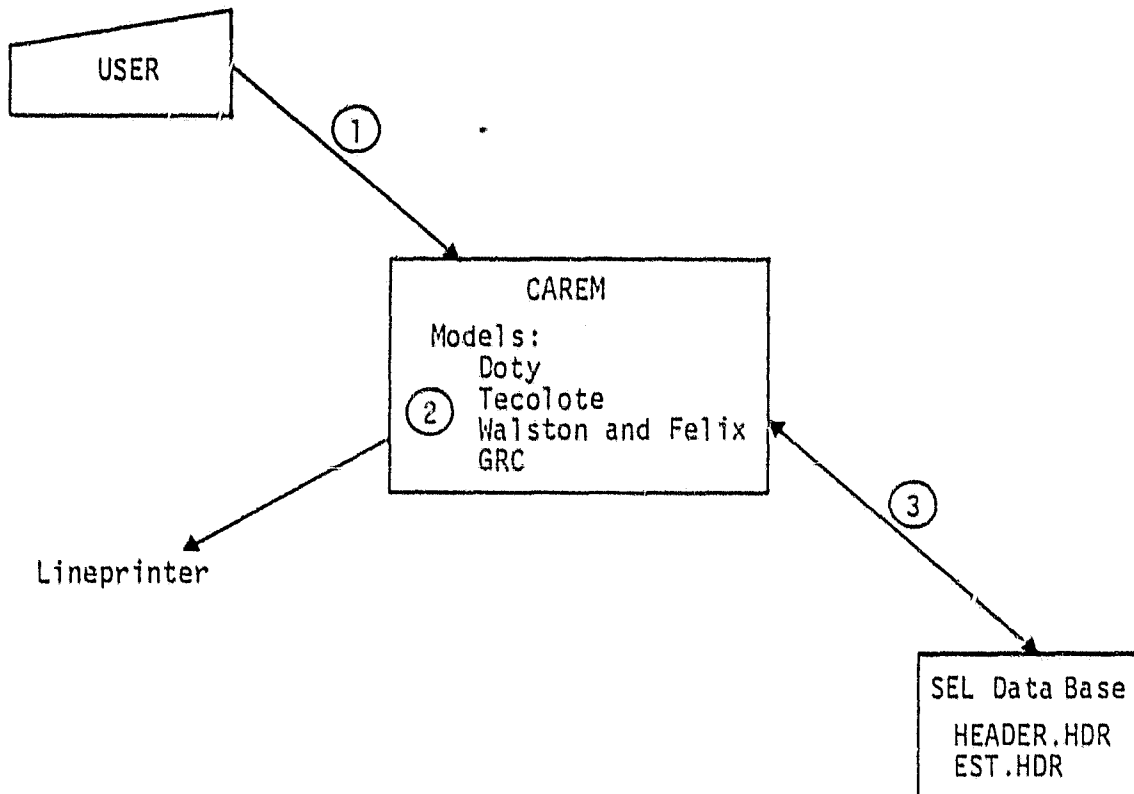
① All program control is through interactive prompts.

② Four estimation models are currently available.

③ The SEL data base is used as the source for project phase dates
   and programmer/management/(other services) hours.

TOOL; CONFIGURATION ANALYSIS TOOL (CAT)

ABSTRACT

The Configuration Analysis Tool (CAT) is an information storage and report generation tool for support of configuration management activities. Configuration management is the process of tracking and directing the evolution of a system. CAT aids in tracking systems by providing a central storage location for information in the following seven categories: milestones, documentation, changes, tests, discprepancies, data set status, and resources.

CAT provides editing facilities through which data can be added or modified. It also provides reports for each of the seven categories. The reports can be formatted for presentation on a CRT or a lineprinter, and the information can optionally be presented in sorted order by subsystem name or entry date.

Input to CAT consists of information about the current status of a system.

Output from CAT is a set of reports displaying the current status of a system.

RESOURCE REQUIREMENTS

PDP-11/70 Operating Resource Requirements

The resource requirements for operating CAT on the PDP-11/70 are as follows:

Operating System: RSM-11M (Version 3.2)

User Interface: Terminal (CRT/Decwriter)

Output Device(s): Terminal, lineprinter

Disk Storage: Task image:
　　　　　　　CAT.TSK = 146 blocks

　　　　　　　Data base $\approx$ 100 blocks

PDP-11/70 Installation Resource Requirements

CAT can be obtained in the form of a system tape. To install CAT, the following are required:

Operating System: RSX-11M (Version 3.2)

Utilities: FLX

Language Processor(s):   FORTRAN-IV+, MACRO

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

1. Functional Requirements/Specifications for Code 580 Configuration Analysis Tool (CAT) (draft) (Computer Sciences Corporation document CSC/TM-80/6051 and NASA/GSFC SEL document SEL-80-001)

2. Configuration Analysis Tool (CAT) Design (Computer Sciences Corporation handwritten draft)

3. Configuration Analysis Tool (CAT) System Description and User's Guide (Computer Sciences Corporation document CSC/SD-80/6089 and NASA/GSFC SEL document SEL-80-004)

Availability:

COSMIC (ID = GSC-12710)

GSFC Computer Program Library (ID = G00754)

GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for CAT that contains the following:

1. Tape description and installation guide

2. Command file to load the files on the CAT tape to disk

3. FORTRAN source code

4. FORTRAN include files

5. Assembler source code

6.   Command files to compile, assemble, and task build
      CAT

7.   Overlay description file

Availability: .

      COSMIC (ID = GSC-12710)
        Received: February 12, 1981
        Evaluated: October 18, 1981

      GSFC Computer Program Library (ID = G00754)

      GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY
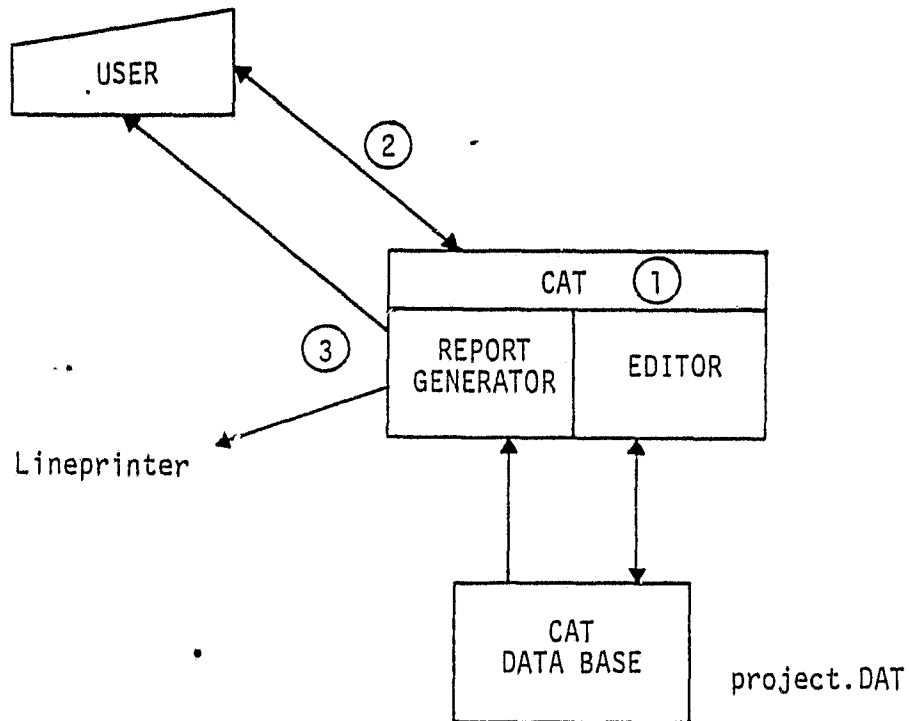
①   The CAT Program operates in two independent modes.

②   All input to the CAT Program is performed interactively.

③   Reports can be directed to the printer or the terminal.

TOOL: CONFIGURATION ANALYSIS TOOL (CAT)

ABSTRACT

The Configuration Analysis Tool (CAT) is an information
storage and report generation tool for support of con-
figuration management activities. Configuration man-
agement is the process of tracking and directing the
evolution of a system. CAT aids in tracking systems by
providing a central storage location for information in
the following seven categories: milestones, documenta-
tion, changes, tests, discrepancies, data set status,
and resources.

CAT provides editing facilities through which data can
be added or modified. It also provides reports for each
of the seven categories. The reports can be formatted
for presentation on a CRT or the lineprinter, and the
information can optionally be presented in sorted order
by subsystem name or entry date.

Input to CAT consists of information about the current
status of a system.

Output from CAT is a set of reports displaying the cur-
rent status of a system.

RESOURCE REQUIREMENTS

VAX-11/780 Operating Resource Requirements

The resource requirements for operating CAT on the
VAX-11/780 are as follows:

Operating System: VAX/VMS (Version 2.3)

User Interface: Terminal (CRT/Decwriter)

Output Device(s):   Terminal, lineprinter

Disk Storage: Task image:
    CAT.EXE = 107 blocks

    Data base ≃ 100 blocks

VAX-11/780 Installation Resource Requirements

CAT can be obtained in the form of a system tape. To install CAT, the following are required:

Operating System: VAX/VMS (Version 2.3)

Utilities: FLX, LIBRARY

Language Processor(s): FORTRAN-IV+, MACRO

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

The following documents were written for the PDP-11/70 version of CAT. However, the user's guide information is also correct for the VAX version of CAT.

1. Functional Requirements/Specifications for Code 580 Configuration Analysis Tool (CAT) (draft) (Computer Sciences Corporation document CSC/TM-80/6051 and NASA/GSFC SEL document SEL-80-001)

2. Configuration Analysis Tool (CAT) Design (Computer Sciences Corporation handwritten draft)

3. Configuration Analysis Tool (CAT) System Description and User's Guide (Computer Sciences Corporation document CSC/SD-80/6089 and NASA/GSFC document SEL-80-004)

Availability:

GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for CAT that contains the following:

1. Tape description and installation guide

2. Command file to load the files on the CAT tape to disk

3. FORTRAN source code

4. FORTRAN include files

5. Assembler source code

6.   Command files to compile, assemble, and link CAT

Availability:

GSFC Code 580 SEL Software Tools Library
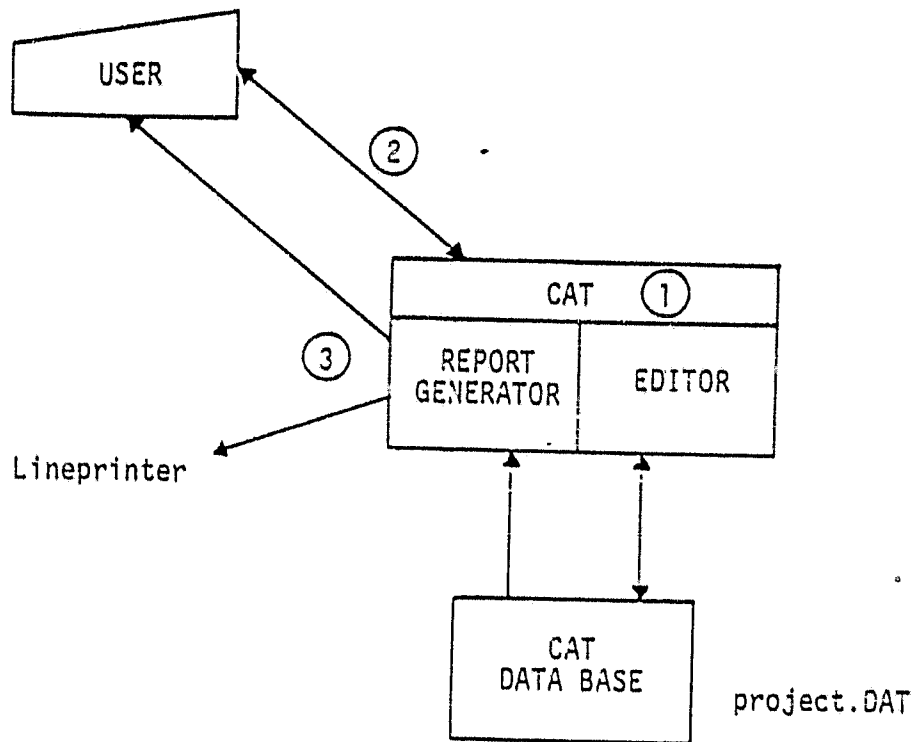
PROCESSING SUMMARY

① The CAT Program operates in two independent modes.

② All input to the CAT Program is performed interactively.

③ Reports can be directed to the printer or the terminal.

TOOL: COMMON SOFTWARE MODULE REPOSITORY (CSMR)

ABSTRACT

The Common Software Module Repository (CSMR) is a software tool designed to support the creation, maintenance, and access of a data base describing software products. The data base contains most information related to the software product, i.e., the source code, abstract, prolog, author, documentation, and status. A user can do the following on line:

- Locate software products meeting specified criteria

- Examine or retrieve material

- Leave a request with the library for desired material

- Display the news file to obtain information about recent additions

Input to CSMR consists of the source code and the description of software products selected for inclusion in the repository.

Output from CSMR is information and source code for software products meeting a user's stated needs.

RESOURCE REQUIREMENTS

PDP-11/70 Operating Resource Requirements

The resource requirements for operating CSMR on the PDP-11/70 are as follows:

Operating System: RSX-11M (Version 3.2)

User Interface: Terminal (CRT/Decwriter)

Output Devices(s):   Terminal (library entry displays), lineprinter (system catalog), tape drive (system catalog)

Disk Storage: Task images:
                        CSMR.TSK = 225 blocks
                        CSMRIN.TSK = 51 blocks

                     Data base ≈ 150 blocks

PDP-11/70 Installation Resource Requirements

CSMR can be obtained in the form of a system tape. To install CSMR, the following are required:

Operating System: RSX-11M (Version 3.2)

Utilities: FLX

Language Processor(s): FORTRAN-IV+, MACRO

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

1. Common Software Module Repository (CSMR) System Description and User's Guide (Computer Sciences Corporation document CSC/SD-79/6103 and NASA/GSFC SEL document SEL-79-003)

Availability:

COSMIC (ID = GSC-12735)

GSFC Computer Program Library (ID = G00767)

GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for CSMR that contains the following:

1. Tape description and installation guide
2. Command file to load the files on the CSMR tape to disk
3. FORTRAN source code
4. Assembler source code
5. FORTRAN include files
6. Command files to compile, assemble, and task build CSMR
7. Overlay description file
8. Command procedure to build and install the TAP utility

Availability:

      COSMIC (ID = GSC-12735)
        Received: April 6, 1981
        Evaluated: November 17, 1981

      GSFC Program Library (ID = G00767)

      GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY
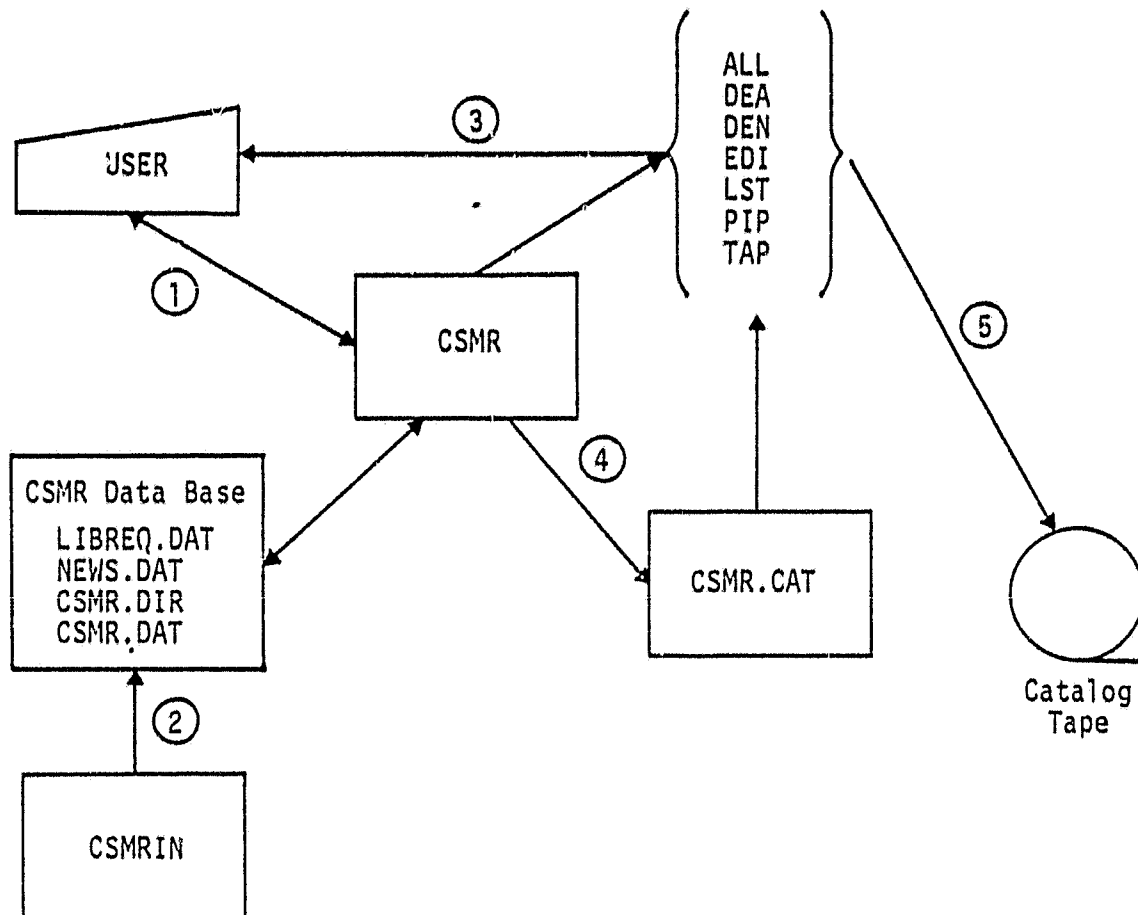
① All program control is through user response to menus.

② The CSMR data base must be initialized with the CSMRIN Program.

③ The user performs some operations through the control of the PDP text editor (EDI) and file listing utility (LST) while the execution of CSMR is suspended. When the user terminates EDI or LST, CSMR resumes execution.

④ A system catalog containing a directory listing, all abstracts, and sorted entries can be created by the librarian.

⑤ The CSMR Program can create a tape copy of the system catalog at the librarian's request.

TOOL: DATA BASE MAINTENANCE SYSTEM (DBAM)

ABSTRACT

The Data Base Maintenance System (DBAM) is an interactive package used to manage collected SEL data. The SEL data are collected from various ongoing projects for evaluation of software development methodologies by managers and researchers.

DBAM provides the following five basic functions for the user: create, archive, restore, compress, and update. Update provides 12 separate functions, each of which allows the user to interactively add to or modify a specific file type. The following seven types of data are maintained on the data base: project, form, SAP, code, status, comments, and computer.

Input to DBAM consists of information from SEL forms, project managers, the SAP Program, and the computer accounting system.

Output from DBAM is an up-to-date SEL data base.

RESOURCE REQUIREMENTS

PDP-11/70 Operating Resource Requirements

The resource requirements for Operating DBAM on the PDP-11/70 are as follows:

Operating System: RSX-11M (Version 3.2)

User Interface: Terminal (CRT/Decwriter)

Output Device(s): Lineprinter, tape drive

Disk Storage: Task images:
ARCFIL.TSK = 204 blocks
CREFIL.TSK = 203 blocks
RESFIL.TSK = 212 blocks
UPDCIF.TSK = 263 blocks
UPDCRF.TSK = 263 blocks
UPDCSF.TSK = 265 blocks
UPDCSR.TSK = 244 blocks
UPDENC.TSK = 209 blocks
UPDEST.TSK = 226 blocks
UPDHDR.TSK = 231 blocks
UPDHIS.TSK = 230 blocks
UPDRAF.TSK = 252 blocks

Disk Storage   UPDRSF.TSK = 247 blocks
(Continued):   UPDSEF.TSK = 233 blocks
                      UPDSTS.TSK = 211 blocks

PDP-11/70 Installation Resource Requirements

DBAM can be obtained in the form of a system tape. To
install DBAM, the following are required:

Operating System: RSX-11M (Version 3.2)

Utilities: FLX

Language Processor(s): SFORT, FORTRAN-IV+

Peripnerals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

1.   Software Engineering Laboratory Data Base Organiza-
     tion and User's Guide (Computer Sciences Corpora-
     tion document CSC/SD-81/6011 and NASA/GSFC SEL
     document SEL-81·002)

Availability

     GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for DBAM that contains the follow-
ing:

1.   Tape description and installation guide

2.   Command file to load the files on the DBAM tape to
     disk

3.   Structured FORTRAN source code

4.   Command files to preprocess, compile, and task
     build DBAM

5.   Overlay description files

6.   All files required to build the Structured FORTRAN
     Preprocessor (SFORT) (see description under
     SFORT(PDP-11/70), System Tape)

Availability

    GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY
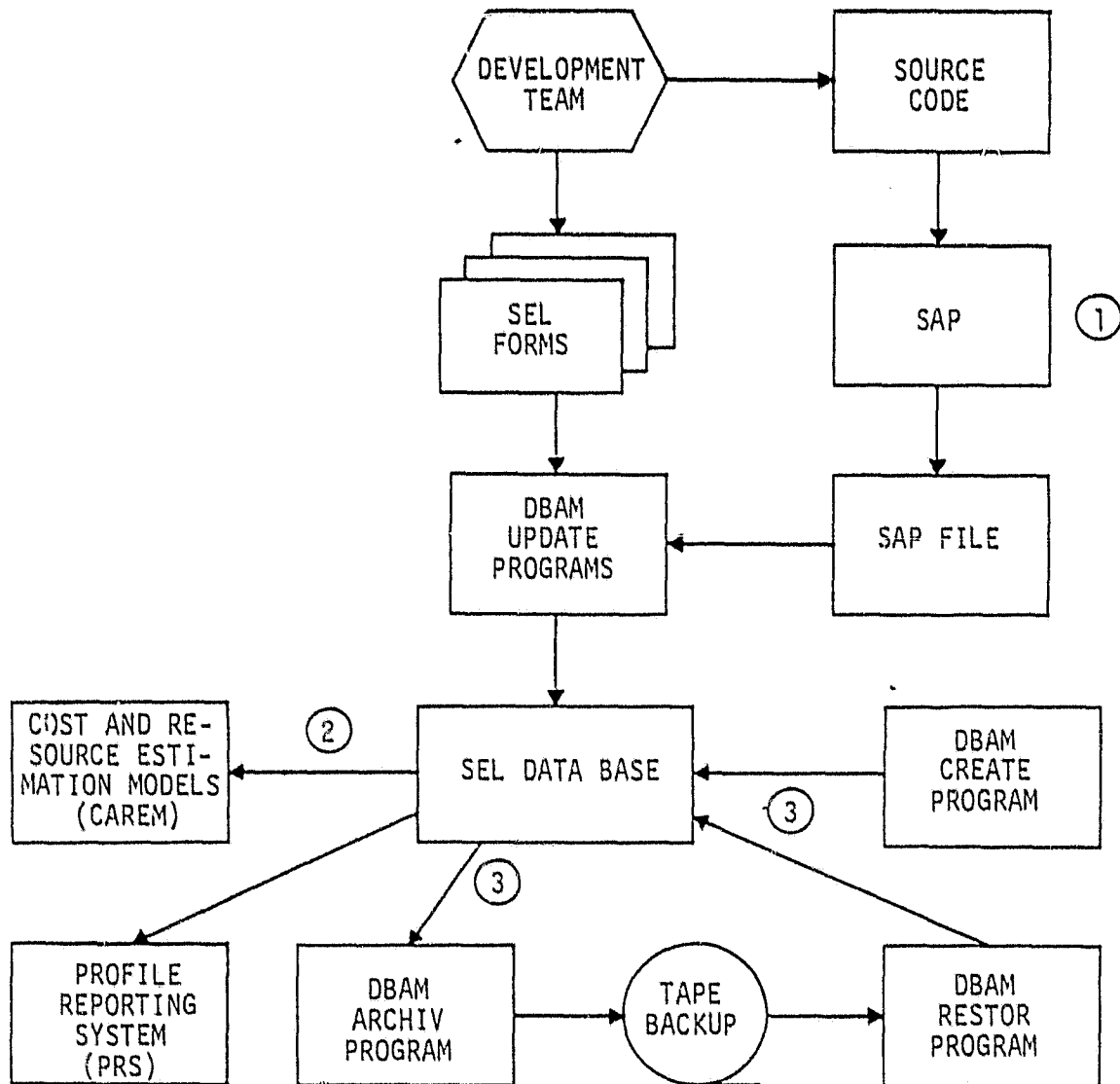
①   The Static Source Code Analyzer Program (SAP) is used to create some input to the SEL data base.

②   Two examples of analysis programs that use SEL data are the Cost and Resource Estimation Models (CAREM) and Profile Reporting System (PRS).

③   The CREATE, RESTOR, AND ARCHIV programs perform SEL data base maintenance.

TOOL: DOCUMENT LIBRARY SUPPORT SOFTWARE SYSTEM

ABSTRACT

The Software Engineering Laboratory (SEL) Document Li-
brary Support Software System (DOCLIB) provides a mech-
anism for the storage and display of information about
the documents contained within the SEL library. Each
document has nine informational items associated with
it: reference number, title, author(s), publication
date, sponsoring organization, number of pages, sub-
ject(s), and organization document number.

DOCLIB provides an editing capability through which data
can be added, modified, displayed, or deleted. For-
matted reports are provided to document the use of the
editing capabilties.

Input to DOCLIB is either data for inclusion in the data
base or queries about the contents of the data base.

Output from DOCLIB consists of terminal displays de-
scribing the documents in the data base. The displays
may optionally be directed to the lineprinter.

RESOURCE REQUIREMENTS

PDP-11/70 Operating Resource Requirements

The resource requirements for operating DOCLIB on the
PDP-11/70 are as follows:

Operating System: RSX-11M (Version 3.2)

User Interface: Terminal (CRT/Decwriter)

Output Device(s):   Terminal, lineprinter

Disk Storage: Task images:
                       DBINIT.TSK = 50 blocks
                       DOCLIB.TSK = 92 blocks
                       LIBMGR.TSK = 104 blocks

                    Data base ≈ 1 document per block

PDP-11/70 Operating Resource Requirements

DOCLIB can be obtained in the form of a system tape. To
install DOCLIB, the following are required:

Operating System: RSX-11M (Version 3.2)

Utilities: FLX

Language Processor(s): FORTRAN-IV+, MACRO

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

1.   Software Engineering Laboratory (SEL), Document
      Library (DOCLIB) System Description and User's
      Guide (Computer Sciences Corporation docu-
      ment CSC/SD-81/6116 and NASA/GSFC SEL document
      SEL-81-006)

Availability:

      GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for DOCLIB that contains the fol-
lowing:

1.   Tape description and installation guide
2.   Command file to load the files on the DOCLIB tape
      to disk
3.   FORTRAN source code for DOCLIB
4.   FORTRAN include file
5.   Assembler source code
6.   DOCLIB help file
7.   Command files to compile, assemble, and task build
      DOCLIB

Availability:

      GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY

```
                                    USER

                              (1)              DOCLIB
                                                HELP     (4)
                             DBINIT             FILE


         (2)
                             DOCUMENT
         LIBMGR              DATA              DOCLIB
                             BASE

         (3)                                              (3)

     Lineprinter            SORTED          Lineprinter
                            DATA
                            FILES
```

(1) The DBINIT Program initializes the document data base.

(2) The Librarian Program (LIBMGR) interacts with the document data base and generates sorted data files.

(3) Reports can be directed to the lineprinter or the terminal.

(4) The DOCLIB Help File instructs the user in running the document display program (DOCLIB).

TOOL: FINANCIAL REPORT GENERATOR PROGRAM (FINREP)

ABSTRACT

The Financial Report Generator Program (FINREP) is a
software tool that produces three financial analysis
reports: (1) monthly task data reports, (2) month-
by-month hourly data summaries, and (3) month-by-month
monetary data summaries. These reports are based on a
master financial report tape supplied in a specific
format. FINREP reports are primarily used as planning
tools for the Mission Support Computing and Analysis
Division (Code 580) of GSFC.

Input to FINREP consists of a master financial tape and
user report generation instructions.

Output from FINREP is a set of financial summary reports.

RESOURCE REQUIREMENTS

PDP-11/70 Operating Resource Requirements

The resource requirements for operating FINREP on the
PDP-11/70 are as follows:

Operating System: RSX-11M (Version 3.2)

User Interfaces: Terminal (CRT/Decwriter) and control
                    input file

Input Device: Tape drive (9 track, 1600 bpi)

Output Device: Lineprinter

Disk Storage: Task images:
                        FINREP.TSK = 122 blocks
                        FININIT.TSK = 46 blocks
                        FINAME.TSK = 64 blocks

                    Data base = 216 blocks

PDP-11/70 Installation Resource Requirements

FINREP can be obtained in the form of a system tape. To
install FINREP, the following are required:

Operating System: RSX-11M (Version 3.2)

Utilities: FLX

Language Processor(s):   FORTRAN-IV+, MACRO

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

1. <u>Financial Report Generator Program (FINREP) System Description and User's Guide</u> (Computer Sciences Corporation document CSC/SD-78/6033)

Availability:

  GSFC Computer Program Library (ID = G00750)

  GSFC Code 580 SEL Software Tools Library

System Tape
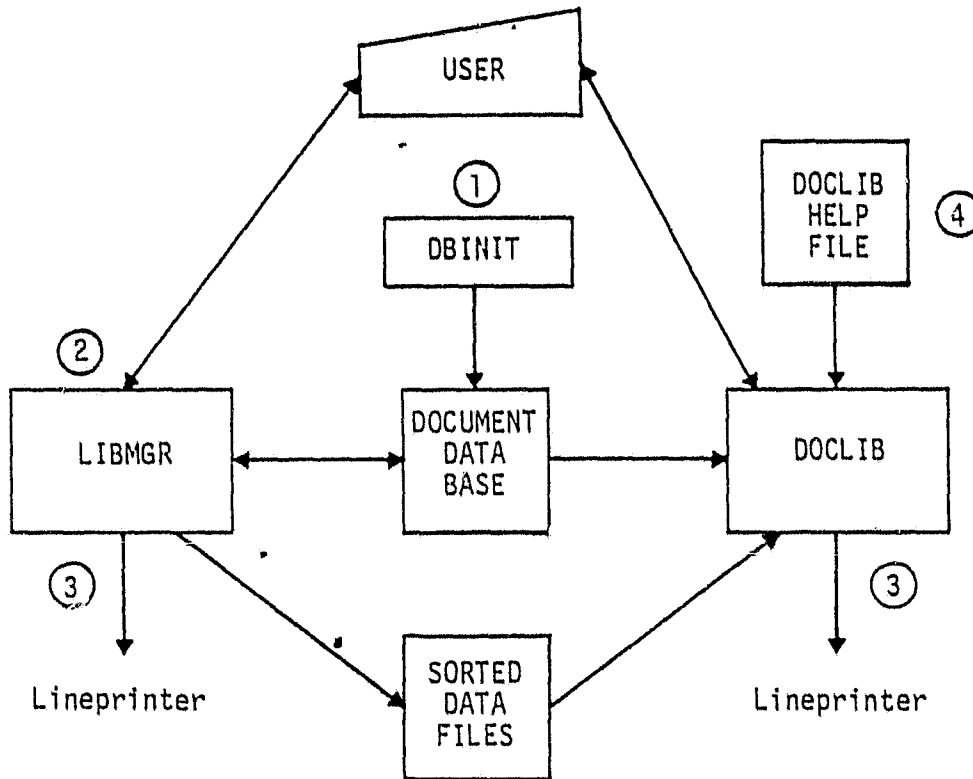
A system tape exists for FINREP that contains the following:

1. Tape description and installation guide
2. Command file to load the files on the FINREP tape to disk
3. FORTRAN source code
4. Assembler source code
5. Command files to compile, assemble, and task build FINREP

Availability:

  GSFC Computer Program Library (ID = G00750)

  GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY

Master
Financial
Tape
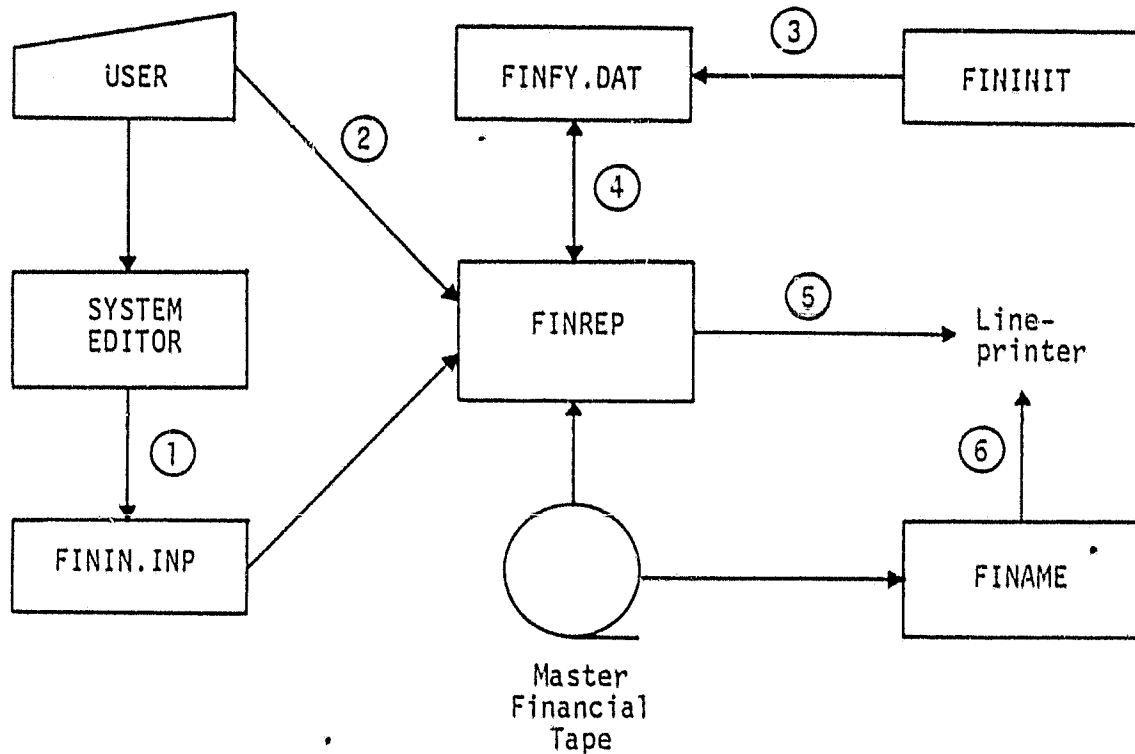
① FINREP control functions are read from a file created by the user with the PDP text editor.

② The user need only verify the date associated with the data on the tape.

③ The FININIT Program is used to create the fiscal year data base at the beginning of each year.

④ The fiscal year data base is updated whenever a new tape is processed.

⑤ Each FINREP report is routed to the printer.

⑥ The FINAME Program may be used to list the names of each task present on a tape.

TOOL: MANPOWER ALLOCATION AND REPORTING SYSTEM (MARS)

ABSTRACT

The Manpower Allocation and Reporting System (MARS) is a software tool that automates a majority of the resource scheduling process used by the GSFC Mission Support Computing and Analysis Division (Code 580). MARS is used to enter, update, and report allocation decisions that are maintained in a data base.

The organization of the data base permits entry, update, and report functions to be performed upon projects, persons, and manpower allocations and constraints. An interactive scheduling feature allows trial-and-error methods to be used on a temporary data base to investigate the results of resource reallocation.

Input to MARS consists of personnel assignments and project schedules and constraints.

Output from MARS is a set of reports analyzing the current staffing and workloads.

RESOURCE REQUIREMENTS

PDP-11/70 Operating Resource Requirements

The resource requirements for operating MARS on the PDP-11/70 are as follows:

Operating System:	RSX-11M (Version 3.2)
User Interface:	Terminal (CRT/Decwriter)
Output Device(s):	Terminal, lineprinter
Disk Storage:	Task images: MARS.TSK = 243 blocks MARSIN.TSK = 49 blocks MARSRD.TSK = 71 blocks MARSUP.TSK = 87 blocks

Data base ≈ 780 blocks

PDP-11/70 Operating Resource Requirements

MARS can be obtained in the form of a system tape. To install MARS, the following are required:

Operating System: RSX-11M (Version 3.2)

Utilities: FLX

Language Processor(s): SFORT, FORTRAN-IV+, MACRO

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

1. Manpower Allocation and Reporting System (MARS) Design Document (Computer Sciences Corporation document CSC/TM-77/6221)

2. Manpower Allocation and Reporting System (MARS) System Description and User's Guide (Computer Sciences Corporation document CSC/TM-77/6295)

3. Manpower Allocation and Reporting System (MARS) System Description and User's Guide (Updates) (Computer Sciences Corporation document CSC/TM-78/6219)

Availability:

COSMIC (ID = GSC-12708)

GSFC Computer Program Library (ID = G00753)

GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for MARS that contains the following:

1. Tape description and installation guide

2. Command file to load the files on the MARS tape to disk

3. FORTRAN source code for MARS

4. Structured FORTRAN source code for the MARSUP and MARSRD routines

5. FORTRAN include files

6. Assembler source code

7. Command files to precompile, compile, assemble, and task build MARS

8. All files required to build the Structured FORTRAN Preprocessor (SFORT) (see description under SFORT(PDP-11/70), System Tape)

Availability:

COSMIC (ID = GSC-12708)
    Received: February 5, 1981
    Evaluated: October 12, 1981

GSFC Computer Program Library (ID = G00753)

GSFC Cole 580 SEL Software Tools Library

PROCESSING SUMMARY
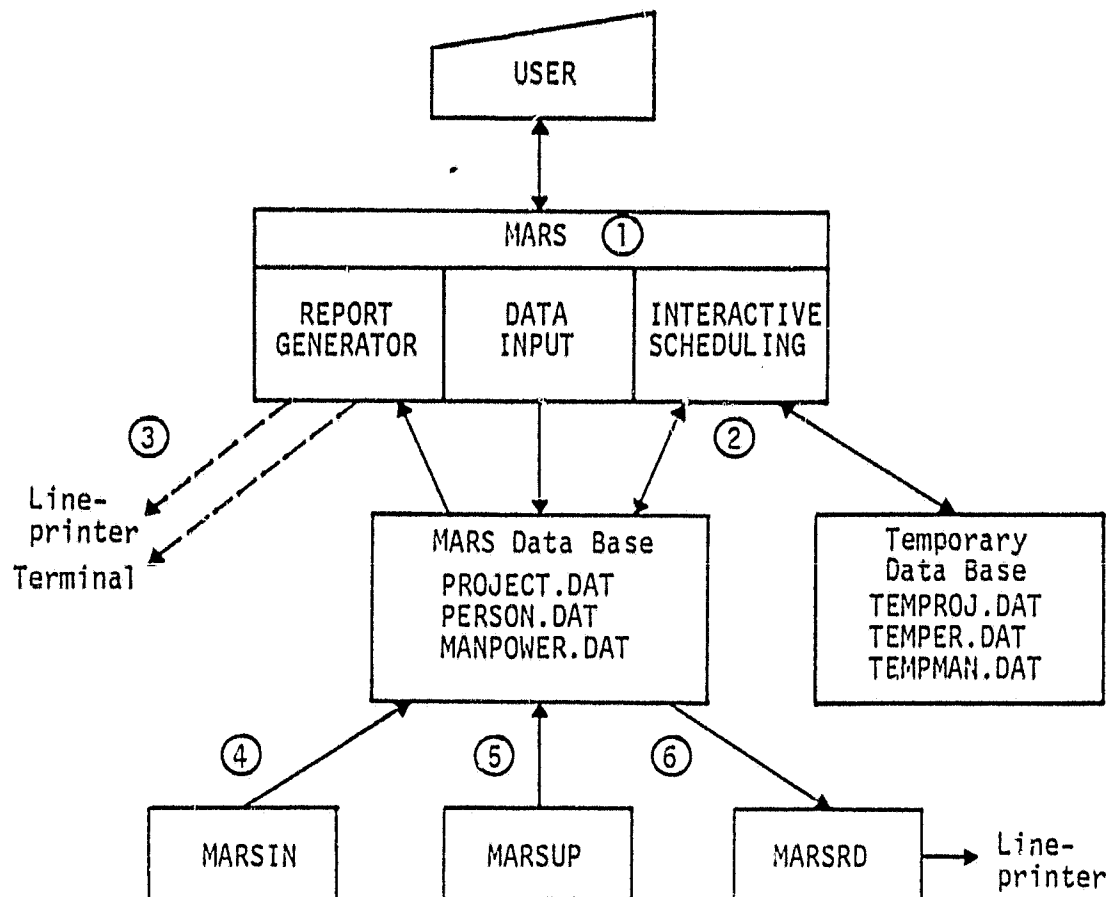
① The MARS Program performs three independent functions.

② During Interactive Scheduling, the MARS Program manipulates a temporary data base. When scheduling is completed, the user may elect to replace the MARS data base with the temporary data base.

③ Reports may be directed to the lineprinter or to the terminal.

④ The MARSIN Program creates an empty data base for use by the MARS Program.

⑤ The MARSUP Program "advances" the MARS data base by 1 year. The earliest year of the 5-year period is deleted and a new year is added at the end of the 5-year period.

⑤ The MARSRD Program is used for debugging. A formatted dump of the entire MARS data base is produced on the lineprinter.

TOOL: <u>MULTI-LEVEL EXPRESSION DESIGN LANGUAGE - REQUIREMENTS</u>
<u>LEVEL (MEDL-R)</u>

ABSTRACT

The Multi-Level Expression Design Language - Require-
ments Level (MEDL-R) Program is a software tool used in
the requirements analysis phase of system development.
MEDL-R is an interactive program that permits the user
to create or modify a data base containing descriptions
of system requirements. The structure of MEDL-R re-
quirements descriptions allows individual requirements
to be categorized or related to other requirements
through "derived from" and "derives" links.

Analysis of the data base can be performed in a "query"
mode in which MEDL-R reports which requirements meet a
specified set of criteria or in various report modes
that summarize certain qualities of the data base.

Input to MEDL-R consists of system requirements ex-
pressed in the MEDL-R language.

Output from MEDL-R is a set of reports describing the
requirements for a system.

RESOURCE REQUIREMENTS

<u>PDP-11/70 Operating Resource Requirements</u>

The resource requirements for operating MEDL-R on the
PDP-11/70 computer are as follows:

Operating System:	RSX-11M (Version 3.2)
User Interface:	Terminal (CRT/Decwriter)
Output Device(s):	Terminal
Disk Storage:	Task images:
	MEDLR.TSK = 424 blocks
	SUMREL.TSK = 83 blocks
	Data base = 400 blocks

<u>PDP-11/70 Installation Resource Requirements</u>

MEDL-R can be obtained in the form of a system tape. To install MEDL-R, the following are required:

Operating System: RSX-11M (Version 3.2)

Utility: FLX

Language Processor(s): FORTRAN-IV+

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

<u>Documentation</u>

1. <u>Multi-Level Expression Design System Requirements Level Description Manual</u> (Martin-Marietta document, February 1979)

2. <u>MEDL-R Language User's Guide</u> (Martin-Marietta document, February 1979)

3. <u>Multi-Level Expression Design Language - Requirements Level (MEDL-R) System Evaluation</u> (Computer Sciences Corporation document CSC/TM-80/6093 and NASA/GSFC SEL document SEL-80-002)

Availability:

GSFC Code 580 SEL Software Tools Library

<u>System Tape</u>

A system tape exists for MEDL-R that contains the following:

1. Tape description and installation guide for MEDL-R

2. Command file to load the files on the MEDL-R tape to disk

3. FORTRAN source code

4. Lexicon skeleton file

5. Command files to compile and task build MEDL-R

6. Overlay description file

Availability:

GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY
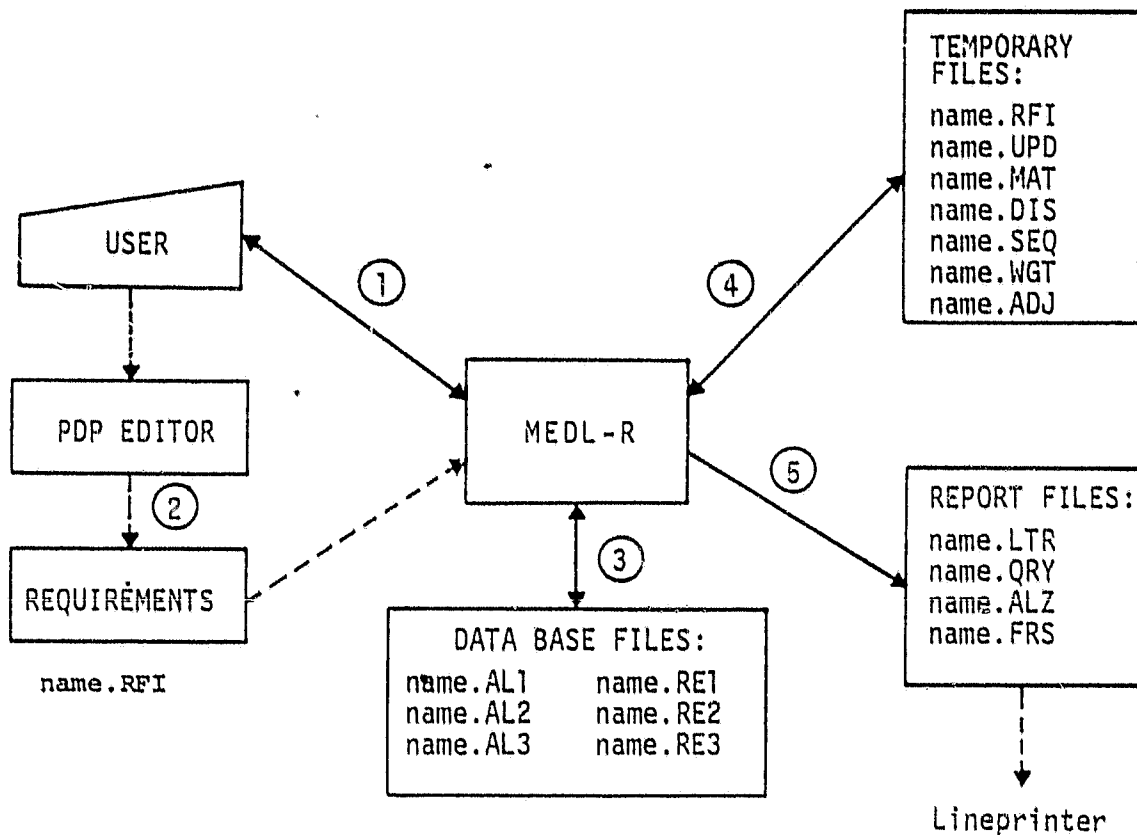
①   All program control is by user commands at a terminal.

②   An input data file may be constructed using the system editor or the MEDL-R "create" facility.

③   The MEDL-R data base is composed of six direct-access files. MEDL-R uses a relational data base organization.

④   MEDL-R uses a variety of temporary files for communication between various MEDL-R functions.

⑤   MEDL-R creates all reports as disk files. The user may list selected reports on the lineprinter after MEDL-R termination.

TOOL: NAMELIST PREPROCESSOR PROGRAM (NPP)

ABSTRACT

The NAMELIST Preprocessor Program (NPP) is a software
tool that brings the FORTRAN NAMELIST input/output (I/O)
feature to the PDP-11/70.   FORTRAN NAMELIST I/O is a
language extension available (with only minor varia-
tions) in IBM, CDC, and UNIVAC FORTRAN dialects.

NPP accepts as input programs containing NAMELIST I/O
statements and produces as output equivalent code with
references to a set of NAMELIST library routines.   The
library routines perform the actual NAMELIST read and
write operations.

NPP can be used to take advantage of the NAMELIST exten-
sion in developing programs for the PDP-11/70 or can be
used when installing programs on the PDP-11/70 that have
been developed on other computers.

RESOURCE REQUIREMENTS

PDP-11/70 Operating Resource Requirements

The resource requirements for operating NPP on the
PDP-11/70 computer are as follows:

Operating System: RSX-11M (Version 3.2)

User Interfaces: Terminal (CRT/Decwriter)

Output Device(s):   Terminal (error log), disk
                    (FORTRAN source code)

Disk Storage: Task image:
                      NPP.TASK = 143 blocks

                    Reference file:
                      KEYWORDS.DAT = 1 block

                    Object library:
                      NAMLIB.OLB = 56 blocks

PDP-11/70 Installation Resource Requirements

NPP can be obtained in the form of a system tape.   To
install NPP, the following are required:

Operating System: RSX-11M (Version 3.2)

Utilities: FLX, LBR

Langu%ge Processor(s):   SFORT, FORTRAN-IV+, MACRO

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

1. NAMELIST Preprocessor Program (NPP) System Description and User's Guide (Computer Sciences Corporation document CSC/SD-78/6090)

Availability:

COSMIC (ID = GSC-12704)

GSFC Computer Program Library (ID = G00752)

GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for NPP that contains the following:

1. Tape description and installation guide
2. Command file to load the files of the NPP tape to disk
3. FORTRAN source code
4. FORTRAN include files
5. Assembler source code
6. Test case
7. Command files to precompile, compile, assemble, and task build NPP
8. Overlay description file
9. All files required to build the Structured FORTRAN Preprocessor (SFORT) (see description under SFORT(PDP-11/70), System Tape)

Availability:

COSMIC (ID = GSC-12704)
    Received: January 19, 1981
    Evaluated: November 19, 1981

GSFC Computer Program Library (ID = G00752)

GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY:

```
┌──────────────┐          ┌──────────┐          ┌──────────────┐
│FORTRAN SOURCE│          │          │          │              │
│CODE CONTAIN- │─────────▶│   NPP    │◀─────────│KEYWORDS.DAT  │
│ING NAMELIST  │          │          │          │              │
│I/O STATEMENTS│          └──────────┘          └──────────────┘
└──────────────┘                │  │
   filename.ext                 │  │                 ①
                                │  └────────────┐
                                ▼               ▼
              ┌─────────────────────┐    ┌──────────────┐
              │ FORTRAN SOURCE CODE │    │   NAMELIST   │
              │  WITH NAMELIST I/O  │    │  DICTIONARY  │
 filename.NPP │ STATEMENTS REPLACED │    │              │
              │    WITH NAMELIST    │    └──────────────┘
              │    LIBRARY CALLS    │       DEFALT.NLD
              └─────────────────────┘          or
                         │                  module.NLD
                         ▼
               ┌──────────────┐                  ③
               │ FORTRAN-IV+  │
               │   COMPILER   │
               └──────────────┘
                      │
┌──────────────┐     ②      ┌──────────────┐     ┌──────────────┐
│   NAMELIST   │─────────▶  │     TASK     │────▶│   PROGRAM    │
│   LIBRARY    │            │   BUILDER    │     │  TASK IMAGE  │
└──────────────┘            └──────────────┘     └──────────────┘
  NAMLIB.OLB
```

①   The NAMELIST dictionary contains information about the variable names and types contained in NAMELIST statements in a particular FORTRAN module (PROGRAM, FUNCTION or SUBROUTINE). Thus, a NAMELIST diction- ary is produced for each module.

②   The NAMELIST library must be referenced in the program task build command file to resolve external references generated during NAMELIST preprocessing.

③   The NAMELIST dictionary is referenced by the NAMELIST library rou- tines when NAMELIST I/O is performed during program execution.

TOOL: NAMELIST PREPROCESSOR PROGRAM (NPP)

ABSTRACT

The NAMELIST Preprocessor Program (NPP) is a software
tool that brings the FORTRAN NAMELIST input/output (I/O)
feature to the VAX-11/780. FORTRAN NAMELIST I/O is a
language extension available (with only minor varia-
tions) in IBM, CDC, and UNIVAC FORTRAN dialects.

NPP accepts as input programs containing NAMELIST I/O
statements and produces as output equivalent code with
references to a set of NAMELIST library routines. The
library routines perform the actual NAMELIST read and
write operations.

NPP can be used to take advantage of the NAMELIST exten-
sion in developing programs for the VAX-11/780 or can be
used when installing programs on the VAX 11/780 that
have been developed on other computers.

RESOURCE REQUIREMENTS

VAX-11/780 Operating Resource Requirements

The resource requirements for operating NPP on the
VAX-11/780 computer are as follows:

Operating System: VAX/VMS (Version 2.3)

User Interface: Terminal (CRT/Decwriter)

Output Device(s): Terminal (error log), disk (FORTRAN
source code)

Disk Storage: Task image:
NPP.EXE = 77 blocks

Reference file:
KEYWORDS.DAT = 3 blocks

Object library:
NAMLIB.OLB = 45 blocks

VAX-11/780 Installation Resource Requirements

NPP can be obtained in the form of a system tape. To
install NPP, the following are required:

Operating System: VAX/VMS (Version 2.3)

Utilities: FLX, LIBRARY

Language Processor(s): SFORT, FORTRAN-IV+, MACRO

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

The following document was written for the PDP-11/70
version of NPP. However, the user's guide information
is also correct for the VAX version of NPP.

1.   NAMELIST Preprocessor Program (NPP) System Descrip-
      tion and User's Guide (Computer Sciences Corpora-
      tion document CSC/SD-78/6090)

Availability:

      COSMIC (ID = GSC-12711)

      GSFC Computer Program Library (ID = G00755)

      GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for NPP that contains the following:
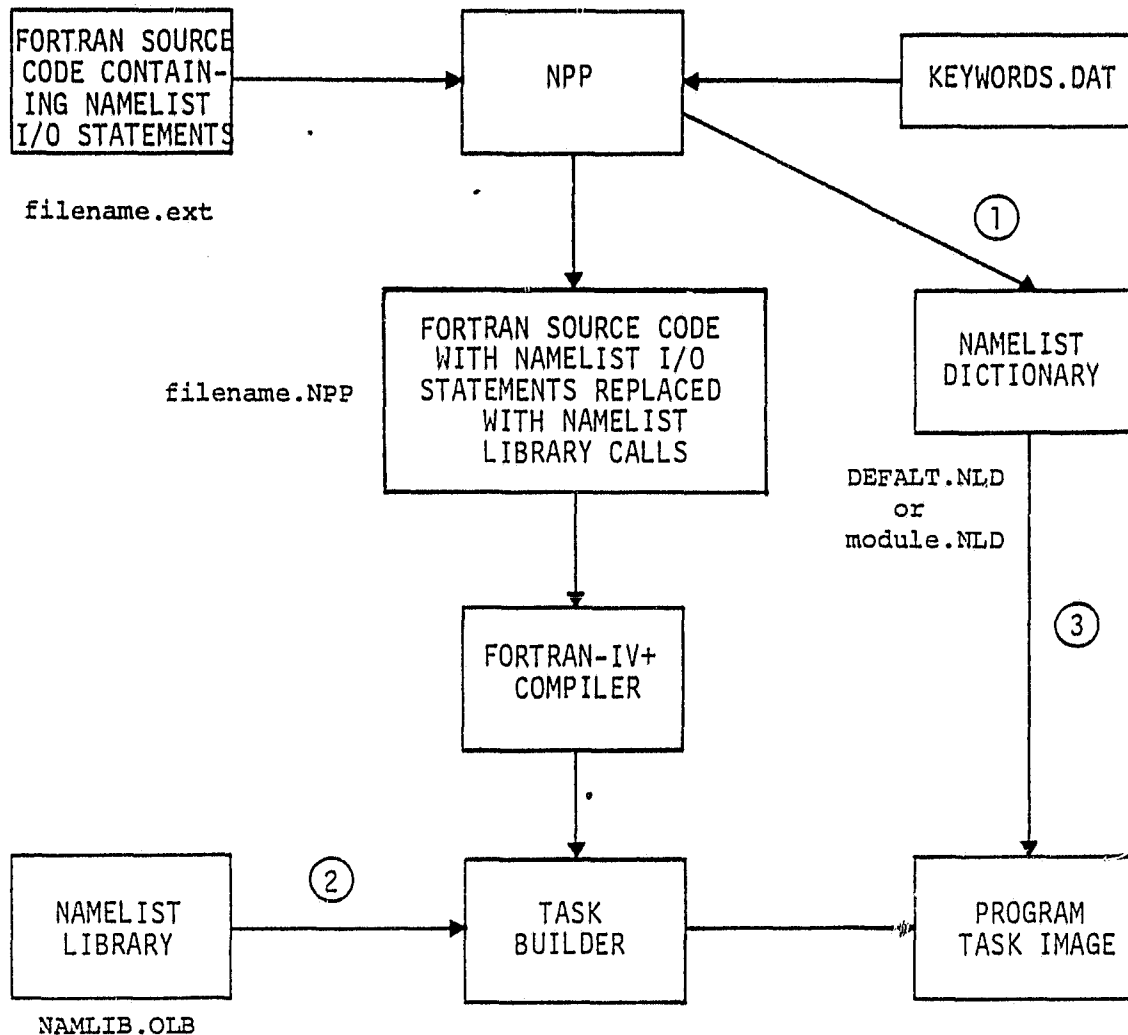
1.   Tape description and installation guide

2.   Command file to load the files of the NPP tape to
      disk

3.   FORTRAN source code

4.   FORTRAN include files

5.   Assembler source code

6.   Test case

7.   Command files to precompile, compile, assemble, and
      link NPP

8.   All files required to build the Structured FORTRAN
      Preprocessor (SFORT) (see description under
      SFORT(VAX-11/780), System Tape)

Availability:

COSMIC (ID = GSC-12711)
   Received: February 12, 1981
   Evaluated: In evaluation

GSFC Computer Program Library (ID = G00755)

GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY

```
┌──────────────┐        ┌──────────┐        ┌──────────────┐
│FORTRAN SOURCE│        │          │        │              │
│CODE CONTAIN- │───────▶│   NPP    │◀───────│ KEYWORDS.DAT │
│ING NAMELIST  │        │          │        │              │
│I/O STATEMENTS│        └──────────┘        └──────────────┘
└──────────────┘           │      ＼
                           │        ＼  ①
  filename.ext             │          ＼
                           ▼            ▼
                ┌──────────────────┐  ┌──────────────┐
                │ FORTRAN SOURCE   │  │              │
                │ CODE WITH        │  │  NAMELIST    │
  filename.NPP  │ NAMELIST I/O     │  │  DICTIONARY  │
                │ STATEMENTS       │  │              │
                │ REPLACED WITH    │  └──────────────┘
                │ NAMELIST         │    DEFALT.NLD
                │ LIBRARY CALLS    │       or
                └──────────────────┘    module.NLD
                           │                   │
                           ▼                  ③│
                ┌──────────────────┐           │
                │  FORTRAN-IV+     │           │
                │  COMPILER        │           │
                └──────────────────┘           │
                           │                   │
                           ▼                   ▼
┌──────────┐  ②  ┌──────────────┐  ┌──────────────┐
│ NAMELIST │─────▶│   LINKER     │─▶│  PROGRAM     │
│ LIBRARY  │      │              │  │  TASK IMAGE  │
└──────────┘      └──────────────┘  └──────────────┘
 NAMLIB.OLB
```

① The NAMELIST dictionary contains information about the variable names and types contained in NAMELIST statements in a particular FORTRAN module (PROGRAM, FUNCTION, or SUBROUTINE). Thus, a NAMELIST dictionary is produced for each module.

② The NAMELIST library must be referenced in the program link command file to resolve external references generated during NAMELIST preprocessing.

③ The NAMELIST dictionary is referenced by the NAMELIST library routines when NAMELIST I/O is performed during program execution.

TOOL: FORTRAN STATIC SOURCE CODE ANALYZER PROGRAM (SAP)

ABSTRACT

The FORTRAN Static Source Code Analyzer Program (SAP) is
a software tool that automatically produces statistics
on the occurrences of statement types and structures
within a FORTRAN program. In addition, SAP produces
information describing the complexity of the source code
in the form of Halstead measures.

SAP output reports are available in several levels of
completeness: (1) detailed listings of SAP statistics
for each source module, (2) detailed summary listings of
SAP statistics for a group of modules, or (3) short sum-
mary listings of a selected subset of SAP statistics on
a module or group of modules.

RESOURCE REQUIREMENTS

PDP-11/70 Operating Resource Requirements

The resource requirements for operating SAP on the
PDP-11/70 are as follows:

Operating System: RSX-11M (Version 3.2)

User Interface: Terminal (CRT/Decwriter)

Output Device: Lineprinter, terminal

Disk Storage: Task images:
                      SAP.TSK = 208 blocks
                      INCLUD.TSK = 49 blocks
                      DEF.TSK = 49 blocks
                      REP2.TSK = 67 blocks

                    SAP user data base ≈ 25 blocks per
                    user

                    Reference files:
                      KEYWORDS.DAT = 3 blocks
                      WEIGHTS.DAT = 1 block

PDP-11/70 Installation Resource Requirements

SAP may be obtained in the form of a system tape. To install SAP, the following are required:

Operating System:	RSX-11M (Version 3.2)
PDP Utilities:	FLX
Language Processor(s):	SFORT, FORTRAN-IV+
Peripherals:	Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

1. FORTRAN Static Source Code Analyzer (SAP) User's Guide (Computer Sciences Corporation document CSC/TM-78/6045 and NASA/GSFC SEL document SEL-78-002) and User's Guide Supplement (hand-written addendum)

2. FORTRAN Static Source Code Analyzer Design and Module Descriptions (Computer Sciences Corporation document CSC/TM-78/6012 and NASA/GSFC SEL document SEL-78-001)

Availability:

COSMIC (ID = GSC-12693)

GSFC Computer Program Library (ID = G00749)

GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for SAP that contains the following:

1. Tape description and installation guide
2. Command file to load the SAP files from the tape to disk
3. FORTRAN source code
4. FORTRAN include files
5. Required data sets (two)
6. Command files to precompile, compile, and task build the various elements of SAP

7. SAP overlay description file

8. All files required to build the Structured FORTRAN
    Preprocessor (SFORT) (see description under
    SFORT(PDP-11/70), System Tape)

Availability:

    COSMIC (ID = GSC-12693)
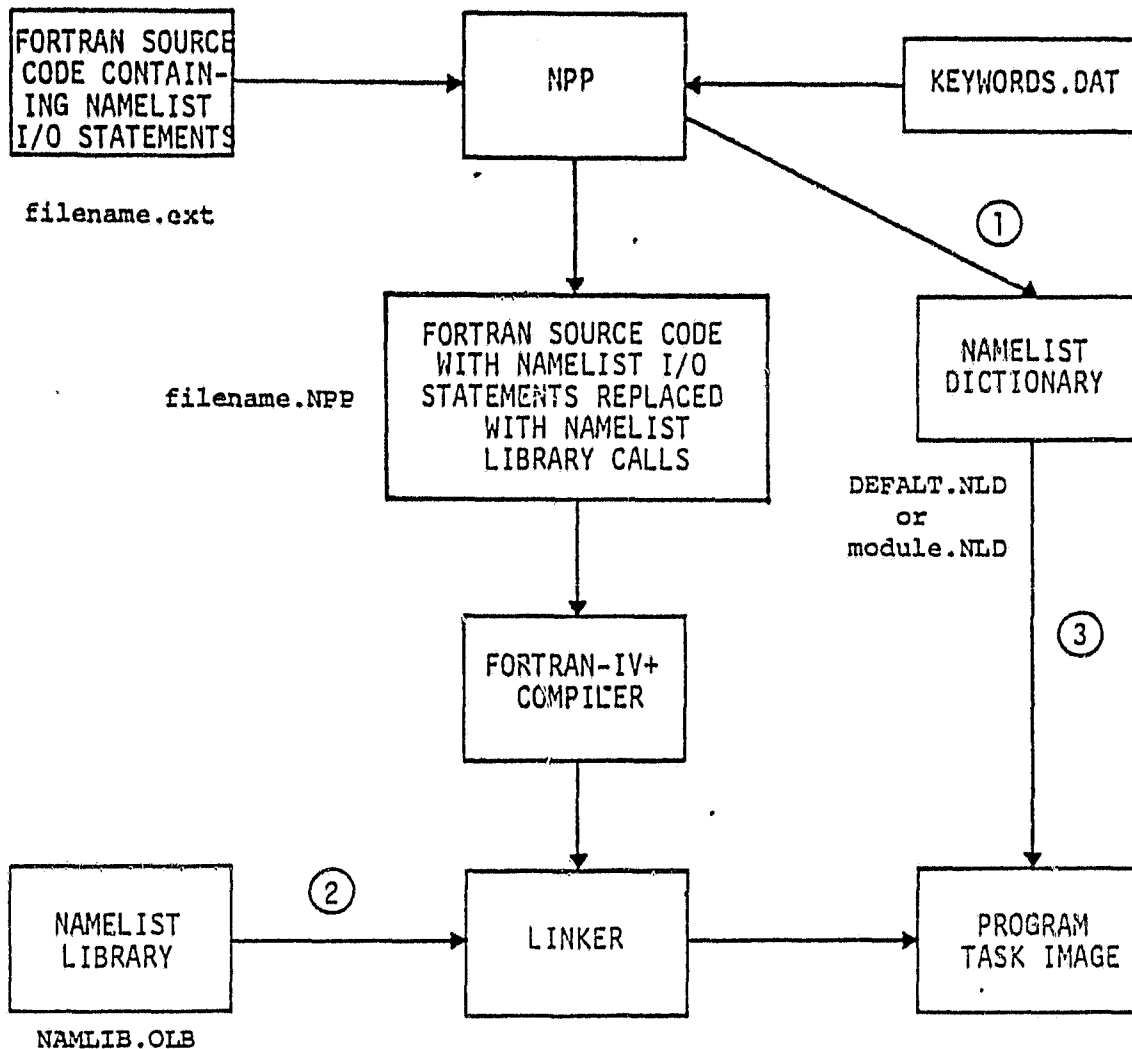   Received: March 5, 1981
      Evaluated: August 17, 1981

    GSFC Computer Program Library (ID = G00749)

    GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY

```
┌──────────┐         ┌──────────┐        ┌──────────┐
│ FORTRAN  │         │          │        │ EXPANDED │
│ SOURCE   │ - - - > │ INCLUD   │ - - -> │ FORTRAN  │
│ CODE     │         │ PROGRAM  │        │ SOURCE   │
│          │         │          │        │ CODE     │
└──────────┘         └──────────┘        └──────────┘
 filename1.ext                            filename2.ext
            (1)              (1)

┌──────────────┐       ┌──────────┐      ┌──────────┐
│ KEYWORDS.DAT │       │   SAP    │      │ DETAILED │
│              │ ----> │ PROGRAM  │ ---> │ REPORTS  │
│ WEIGHTS.DAT  │  (4)  │          │      │          │
└──────────────┘       └──────────┘      └──────────┘
                                          FOR006.DAT
                                          FOR007.DAT

┌──────────┐   (2)   ┌──────────┐
│   DEF    │         │   SAP    │
│ PROGRAM  │ ------> │ DATA BASE│
│          │         │          │
└──────────┘         └──────────┘
           filename3.DAT
            (default)       (3)
                       ┌──────────┐      ┌──────────┐
                       │   REP2   │      │ SUMMARY  │
                       │ PROGRAM  │ ---> │ REPORTS  │
                       │          │      │          │
                       └──────────┘      └──────────┘
                                          FOR006.DAT
```

(1) The SAP FORTRAN source code may be direct input to SAP or, if the source code contains INCLUDE statements, the code may be preprocessed by the INCLUD Program to insure that the statistics are complete.

(2) A required preliminary step to the execution of the SAP Program is the creation of the SAP data base file using the DEF Program.

(3) The REP2 Program may be used to produce summary reports after SAP execution if the user does not wish to examine voluminous detailed reports.

(4) KEYWORDS.DAT and WEIGHTS.DAT are permanent files required for SAP execution.

TOOL: FORTRAN STATIC SOURCE CODE ANALYZER PROGRAM (SAP)

ABSTRACT

The FORTRAN Static Source Code Analyzer Program (SAP) is
a software tool that automatically produces statistics
on the occurrences of statement types and structures
within a FORTRAN program. In addition, SAP produces
information describing the complexity of the source code
in the form of Halstead measures.

SAP output reports are available in several levels of
completeness: (1) detailed listings of SAP statistics
for each source module, (2) detailed summary listings of
SAP statistics for a group of modules, or (3) short sum-
mary listings of a selected subset of SAP statistics on
a module or group of modules.

RESOURCE REQUIREMENTS

VAX-11/780 Operating Resource Requirements

The resource requirements for operating SAP on the
VAX-11/780 are as follows:

Operating System: VAX/VMS (Version 2.3)

User Interface: Terminal (CRT/Decwriter)

Output Device(s):   Lineprinter, terminal

Disk Storage: Task images:
                        SAP.EXE = 122 blocks
                        INCLUD.EXE = 7 blocks
                        REP2.EXE = 13 blocks
                        DEF.EXE = 6 blocks

                    Data base ≈ 25 blocks

                    Reference files:
                        KEYWORDS.DAT = 3 blocks
                        WEIGHTS.DAT = 1 block

VAX-11/780 Installation Resource Requirements

SAP can be obtained in the form of a system tape. To
install SAP, the following are required:

Operating System: VAX/VMS (Version 2.3)

VAX Utilities: FLX

Language Processor(s):   SFORT, FORTRAN-IV+

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

The following documents were written for the PDP-11/70
version of SAP. However, the user's guide information
is also correct for the VAX version of SAP.

1.   FORTRAN Static Source Code Analyzer (SAP) User's
     Guide (Computer Sciences Corporation document
     CSC/TM-78/6045 and NASA/GSFC SEL document
     SEL-78-002) and User's Guide Supplement (hand-
     written addendum)

2.   FORTRAN Static Source Code Analyzer Design and Mod-
     ule Descriptions (Computer Sciences Corporation
     document CSC/TM-78/6012 and NASA/GSFC SEL document
     SEL-78-001)

Availability:

     COSMIC (ID = GSC-12724)

     GSFC Computer Program Library (ID = G00758)

     GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for SAP that contains the following:

1.   Tape description and installation guide

2.   Command file to load the SAP files from the tape to
     disk

3.   FORTRAN source code

4.   FORTRAN include files

5.   Required data sets (two)

6.   Command files to precompile, compile, and link the
     various elements of SAP

7.   All files required to build the Structured FORTRAN
     Preprocessor (SFORT) (see description under
     SFORT(VAX-11/780), System Tape)
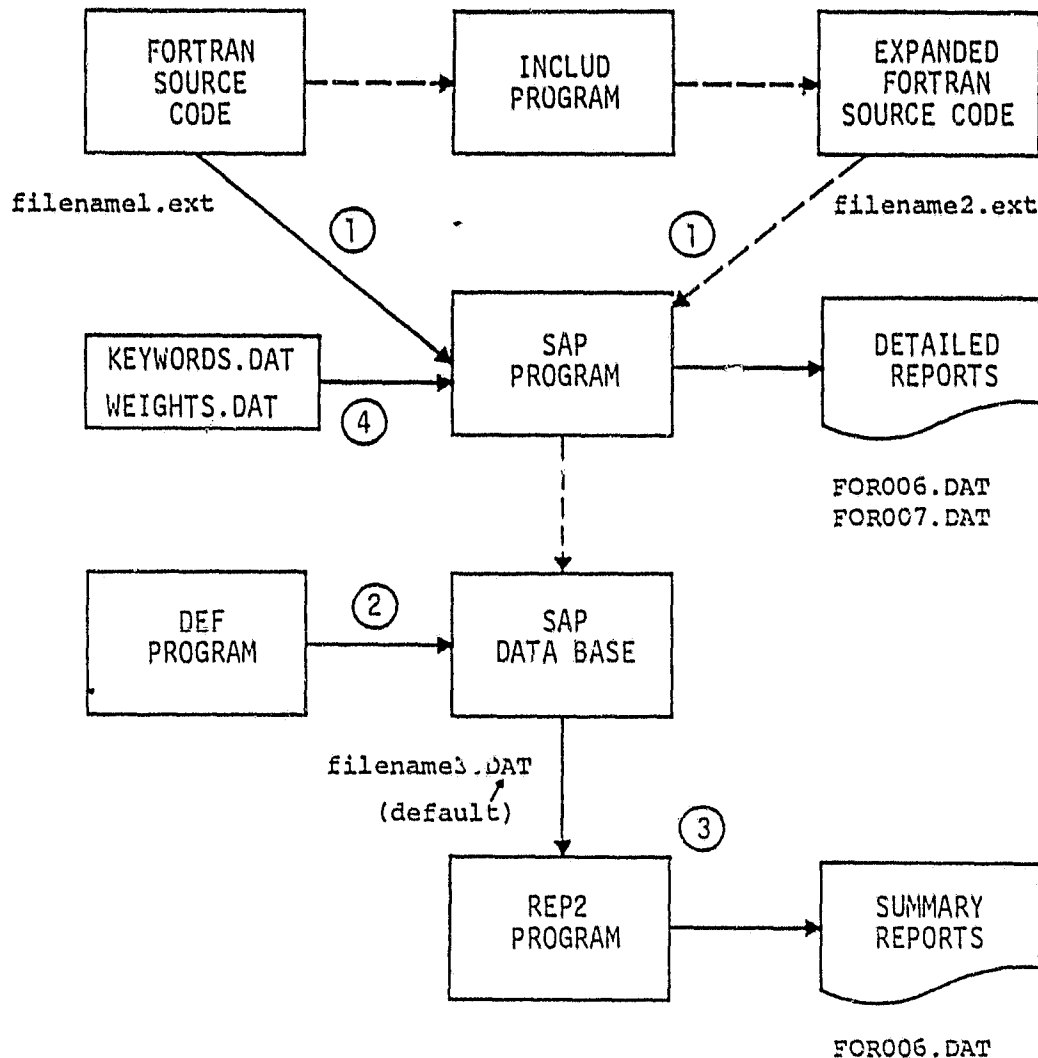
Availability:

COSMIC (ID = GSC-12724)
Received: March 16, 1981
Evaluated: In evaluation

GSFC Computer Program Library (ID = G00758)

GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY

```
┌──────────┐        ┌──────────┐        ┌──────────┐
│ FORTRAN  │        │  INCLUD  │        │ EXPANDED │
│ SOURCE   │------->│ PROGRAM  │------->│ FORTRAN  │
│  CODE    │        │          │        │ SOURCE   │
│          │        │          │        │  CODE    │
└──────────┘        └──────────┘        └──────────┘
```

filename1.ext   ①   ①   filename2.ext

```
┌──────────────────┐       ┌──────────┐       ┌──────────┐
│ KEYWORDS.DAT     │       │   SAP    │       │ DETAILED │
│ WEIGHTS.DAT      │------>│ PROGRAM  │------>│ REPORTS  │
│              ④   │       │          │       │          │
└──────────────────┘       └──────────┘       └──────────┘
```

FOR006.DAT
FOR007.DAT

```
┌──────────┐     ②    ┌──────────┐
│   DEF    │          │   SAP    │
│ PROGRAM  │--------->│ DATA BASE│
│          │          │          │
└──────────┘          └──────────┘
```

filename3.DAT
(default)   ③

```
               ┌──────────┐       ┌──────────┐
               │   REP2   │       │ SUMMARY  │
               │ PROGRAM  │------>│ REPORTS  │
               │          │       │          │
               └──────────┘       └──────────┘
```

FOR006.DAT

① The SAP FORTRAN source code may be direct input to SAP or, if the
   source code contains INCLUDE statements, the code may be preproc-
   essed by the INCLUD Program to insure that the statistics are com-
   plete.

② A required preliminary step to the execution of the SAP Program is
   the creation of the SAP data base file using the DEF Program.

③ The REP2 Program may be used to produce summary reports after SAP
   execution if the user does not wish to examine voluminous detailed
   reports.

④ KEYWORDS.DAT and WEIGHTS.DAT are permanent files required for SAP
   execution.

TOOL: <u>STRUCTURED FORTRAN PREPROCESSOR (SFORT)</u>

ABSTRACT

The Structured FORTRAN Preprocessor (SFORT) is a soft-
ware tool used to extend the capabilities of the FORTRAN
language. Computer programs written in the SFORT lan-
guage can contain the structured programming constructs
IF...ELSE...ENDIF and DOWHILE...ENDDO, in addition to
any valid FORTRAN statement.

The SFORT preprocessor accepts as input programs written
in the SFORT language and produces as output valid,
equivalent FORTRAN source code.
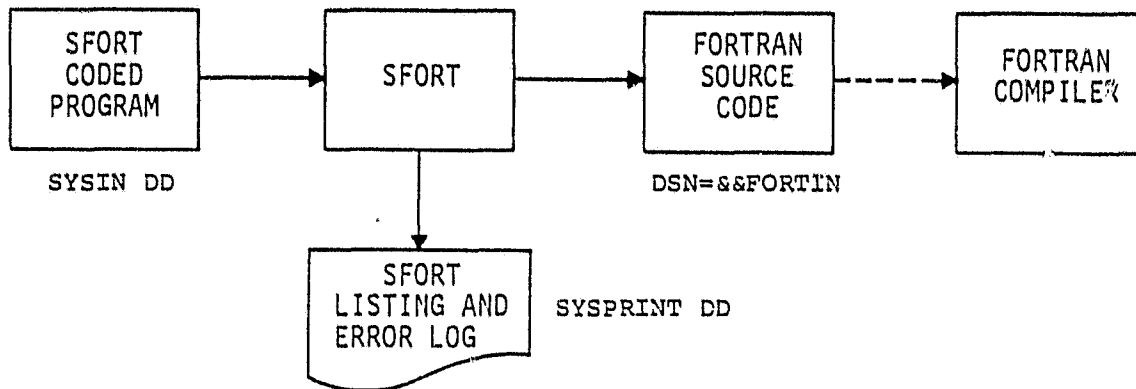
AVAILABLE ITEMS

<u>Documentation</u>

1. <u>Structured FORTRAN Preprocessor (SFORT)</u> (Computer
    Sciences Gorporation document CSC/TM-77/6256 and
    NASA/GSFC SEL document SEL-77-003)

2. <u>Structured FORTRAN Preprocessor (SFORT) 360 System
    Maintenance Guide</u> (Computer Sciences Corporation
    document CSC/SD-78/6068)

Availability:

GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY

```
┌──────────┐        ┌──────────┐      ┌──────────┐        ┌──────────┐
│  SFORT   │        │          │      │ FORTRAN  │        │ FORTRAN  │
│  CODED   │───────▶│  SFORT   │─────▶│ SOURCE   │ ─ ─ ─ ▶│ COMPILER │
│ PROGRAM  │        │          │      │  CODE    │        │          │
└──────────┘        └────┬─────┘      └──────────┘        └──────────┘
 SYSIN DD                │              DSN=&&FORTIN
                         │
                         ▼
                   ┌──────────┐
                   │  SFORT   │
                   │LISTING AND│   SYSPRINT DD
                   │ERROR LOG │
                   └──────────┘
```

TOOL: STRUCTURED FORTRAN PREPROCESSOR (SFORT)

ABSTRACT

The Structured FORTRAN Preprocessor (SFORT) is a software tool used to extend the capabilities of the FORTRAN language. Computer programs written in the SFORT language can contain the structured programming constructs IF...ELSE...ENDIF and DOWHILE...ENDDO, in addition to any valid FORTRAN statement.

The SFORT preprocessor accepts as input programs written in the SFORT language and produces as output valid, equivalent FORTRAN source code.

RESOURCE REQUIREMENTS

PDP-11/70 Operating Resource Requirements

The resource requirements for operating SFORT on the PDP-11/70 are as follows:

Operating System:	RSX-11M (Version 3.2)
User Interface:	Terminal (CRT/Decwriter)
Output Devices:	Lineprinter (SFORT listing/error log), disk (FORTRAN source code)
Disk Storage:	Task image: FPP.TSK = 70 blocks

PDP-11/70 Installation Resource Requirements

SFORT can be obtained in the form of a system tape. To install SFORT on the PDP-11/70, the following are required:

Operating System:	RSX-11M (Version 3.2)
Utilities:	FLX
Language Processor(s):	FORTRAN-IV+, MACRO
Peripherals:	Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

1. Structured FORTRAN Preprocessor (SFORT) 11/70
    User's Guide (Computer Sciences Corporation docu-
    ment CSC/SD-78/6128 and NASA/GSFC SEL document
    SEL-78-004)

Availability:

    COSMIC (ID = GSC-12688)

    GSFC Computer Program library (ID = G00747)

    GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for SFORT that contains the follow-
ing:

1. Tape description and installation guide
2. Command file to load the files on the SFORT tape to
    disk
3. FORTRAN source code
4. Assembler source code
5. Command files to compile, assemble, and task build
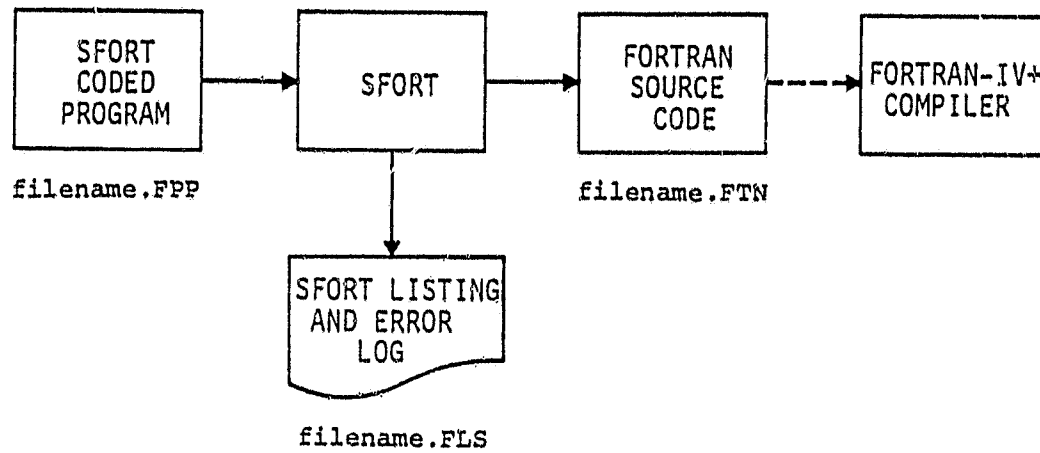   SFORT

Availability:

    COSMIC (ID = GSC-12688)
       Received: October 30, 1980
       Evaluated: September 10, 1981
    GSFC Computer Program Library (ID = G00747)
    GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY

```
┌─────────────┐     ┌─────────────┐     ┌─────────────┐       ┌─────────────┐
│    SFORT    │     │             │     │   FORTRAN   │       │ FORTRAN-IV+ │
│    CODED    │────▶│    SFORT    │────▶│   SOURCE    │- - - ▶│  COMPILER   │
│   PROGRAM   │     │             │     │    CODE     │       │             │
└─────────────┘     └─────────────┘     └─────────────┘       └─────────────┘

filename.FPP              │                filename.FTN
                          │
                          ▼
                  ┌─────────────┐
                  │SFORT LISTING│
                  │  AND ERROR  │
                  │     LOG     │
                  └─────────────┘

                  filename.FLS
```

TOOL: STRUCTURED FORTRAN PREPROCESSOR (SFORT)

ABSTRACT

The Structured FORTRAN Preprocessor (SFORT) is a software tool used to extend the capabilities of the FORTRAN language. Computer programs written in the SFORT language can contain the structured programming constructs IF...ELSE...ENDIF and DOWHILE...ENDDO, in addition to any valid FORTRAN statement.

The SFORT preprocessor accepts as input programs written in the SFORT language and produces as output valid, equivalent FORTRAN source code.

RESOURCE REQUIREMENTS

VAX-11/780 Operating Resource Requirements

The resource requirements for operating SFORT on the VAX-11/780 are the following:

Operating System: VAX/VMS (Version 2.3)

User Interface: Terminal (CRT/Decwriter)

Output Device(s):   Lineprinter (SFORT listing/error log), disk (FORTRAN source code)

Disk Storage: Task image:
                    FPP.EXE = 29 blocks

VAX-11/780 Installation Resource Requirements

SFORT may be obtained in the form of a system tape. To install SFORT on the VAX-11/780, the following are required:

Operating System: VAX/VMS (Version 2.3)

Utilities: FLX

Language Processor(s):   FORTRAN-IV+, MACRO

Peripherals: Tape drive (9 track, 1600 bpi)

AVAILABLE ITEMS

Documentation

The following document was written for the PDP-11/70
version of SFORT. However, the user's guide information
is also correct for the VAX version of SFORT.

1. Structured FORTRAN Preprocessor (SFORT) PDP-11/70
    User's Guide (Computer Sciences Corporation docu-
    ment CSC/SD-78/6128 and NASA/GSFC SEL document
    SEL-78-004)

Availability:

    COSMIC (ID = GSC-12712)

    GSFC Computer Program Library (ID = G00756)

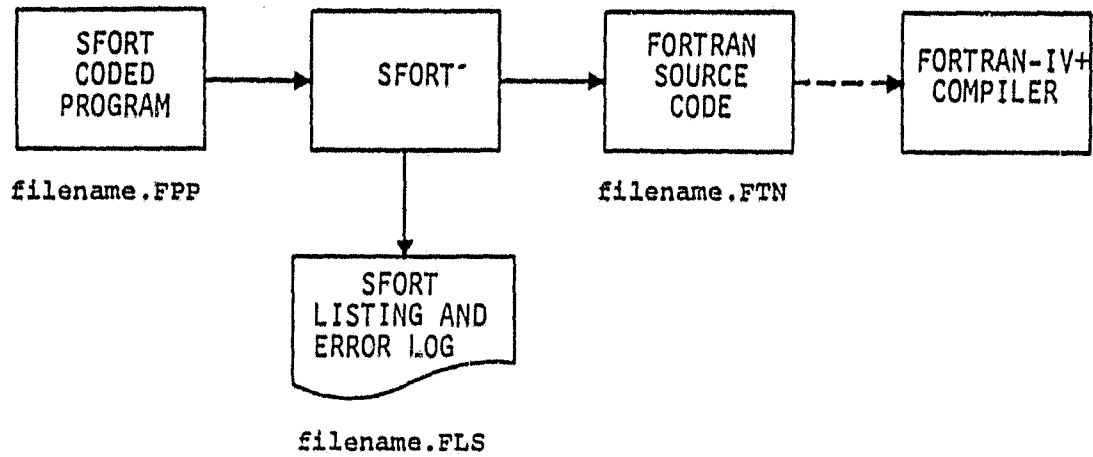   GSFC Code 580 SEL Software Tools Library

System Tape

A system tape exists for SFORT that contains the follow-
ing:

1. Tape description and installation guide

2. Command file to load the files from the SFORT tape
    to disk

3. FORTRAN source code

4. Assembler source code

5. Command files to compile, assemble, and link SFORT

Availability:

    COSMIC (ID = GSC-12712)
       Received: February 12, 1981
       Evaluated: In evaluation

    GSFC Computer Program Library (ID = G00756)

    GSFC Code 580 SEL Software Tools Library

PROCESSING SUMMARY

```
┌──────────┐      ┌──────────┐      ┌──────────┐      ┌──────────┐
│  SFORT   │      │          │      │ FORTRAN  │      │FORTRAN-IV+│
│  CODED   │─────▶│  SFORT   │─────▶│ SOURCE   │ ──── ▶│ COMPILER │
│ PROGRAM  │      │          │      │  CODE    │      │          │
└──────────┘      └────┬─────┘      └──────────┘      └──────────┘
 filename.FPP          │             filename.FTN
                       ▼
                 ┌──────────┐
                 │  SFORT   │
                 │LISTING AND│
                 │ERROR LOG │
                 └──────────┘
                 filename.FLS
```

APPENDIX A - LOCATION OF SOFTWARE TOOLS IN THE SEL

The software tools described in this document are maintained
on line to support users of the SEL. Table A-1 lists the
file locations of these tools. These files are the files
upon which maintenance is performed. Files in other loca-
tions may possibly be superseded versions or test versions.

The information specified in Table A-1 represents the SEL
software tool status as of January 4, 1982.

Tool	Executable Image, Object Library, and Reference File Locations
CAREM(PDP)	DB1:[213,2]CAREM.TSK
CAT(PDP)	DB1:[213,2]CAT.TSK
CAT(VAX)	DBB1:[TOOLS]CAT.EXE
CSMR(PDP)	DB1:[213,2]CSMR.TSK DB1:[213,2]CSMRIN.TSK
DBAM(PDP)	DB1:[204,5]DMARCFIL.TSK DB1:[204,5]DMCREFIL.TSK DB1:[204,5]DMRESFIL.TSK DB1:[204,5]DMUPDCIF.TSK DB1:[204,5]DMUPDCRF.TSK DB1:[204,5]DMUPDCSF.TSK DB1:[204,5]DMUPDCGR.TSK DB1:[204,5]DMUPDENC.TSK DB1:[204,5]DMUPDEST.TSK DB1:[204,5]DMUPDHDR.TSK DB1:[204,5]DMUPDHIS.TSK DB1:[204,5]DMUPDRAF.TSK DB1:[204,5]DMUPDRSF.TSK DB1:[204,5]DMUPDSEF.TSK DB1:[204,5]DMUPDSTS.TSK .
DOCLIB(PDP)	DB1:[213,2]DBINIT.TSK DB1:[213,2]DOCLIB.TSK DB1:[213,2]LIBMGR.TSK
FINREP(PDP)	DB1:[213,2]FINREP.TSK DB1:[213,2]FINAME.TSK DB1:[213,2]FININIT.TSK
MARS(PDP)	DB1:[213,2]MARS.TSK DB1:[213,2]MARSIN.TSK DB1:[213,2]MARSUP.TSK DB1:[213,2]MARSRD.TSK
MEDL-R(PDP)	DB1:[213,2]MEDLR.TSK DB1:[213,2]SUMREL.TSK
NPP(PDP)	DB1:[213,2]NPP.TSK DB1:[213,2]NAMLIB.OLB DB1:[213,2]KEYWORDS.DAT
NPP(VAX)	DBB1:[TOOLS]NPP.EXE DBB1:[TOOLS]NAMLIB.OLB DBB1:[TOOLS]KEYWORDS.DAT

Table A-1. SEL Software Tools and Their Locations (2 of 2)

Tool	Executable Image, Object Library, and Reference File Locations
SAP(PDP)	DB1:[213,2]SAP.TSK DB1:[213,2]INCLUD.TSK DB1:[213,2]DEF.TSK DB1:[213,2]REP2.TSK DB1:[213,2]KEYWORDS.DAT DB1:[213,2]WEIGHTS.DAT
SAP(VAX)	DBB1:[TOOLS]SAP.EXE DBB1:[TOOLS]INCLUD.EXE DBB1:[TOOLS]DEF.EXE DBB1:[TOOLS]REP2.EXE DBB1:[TOOLS]KEYWORDS.DAT DBB1:[TOOLS]WEIGHTS.DAT
SFORT(360)	GJGTP.SF.LOAD(PRECOMP9)
SFORT(PDP)	DB1:[213,2]FPP.TSK
SFORT(VAX)	DBB1:[TOOLS]FPP.EXE

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